

GBU 268 / #2  
ref  
9-30-02

**CERTIFICATE OF MAILING (37 CFR 1.8(a))**

I hereby certify that this correspondence (along with any referred to as being attached or enclosed) is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D. C. 20231, on September 18, 2002.



Signature: Karena Moy-Brown  
Karena Moy-Brown

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

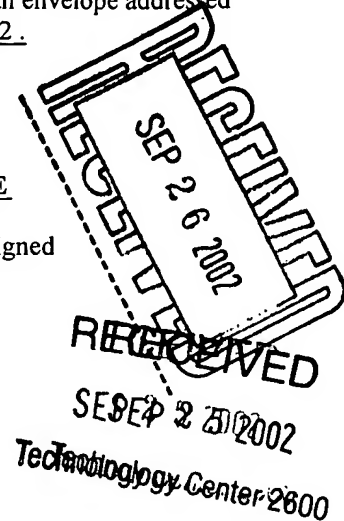
In re application of:  
Gleb V. Klimovitch

Serial No. 10/024,120  
Filed: December 17, 2001

For: SYSTEM, APPARATUS, AND METHOD OF  
ESTIMATING MULTIPLE-INPUT  
MULTIPLE-OUTPUT WIRELESS CHANNEL  
WITH COMPENSATION FOR PHASE NOISE  
AND FREQUENCY OFFSET

Examiner: Not yet assigned

Group Art Unit: 2681



**INFORMATION DISCLOSURE STATEMENT SUBMITTED  
PRIOR TO THE FIRST OFFICIAL ACTION**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

In accordance with 37 C.F.R. §§ 1.56 and 1.97 through 1.98, applicants wish to make known to the Patent and Trademark Office the reference set forth on the attached form PTO-1449 (copies of the cited references, as required under 37 C.F.R. § 1.98, are enclosed). Although the aforesaid references are made known to the Patent and Trademark Office in compliance with applicant's duty to disclose all information he is aware of which is believed relevant to the examination of the above-identified application, applicant believes that his invention is patentable.

Applicant also wishes to make known to the Patent and Trademark Office that an application, Serial No. 09/678,420, describing and claiming subject matter that is similar to the subject matter of this application, was filed on October 2, 2000. This related application, as well as any prior art cited therein, may be material to the examination of this application. A copy of this related application as filed is submitted herewith in accordance with 37 C.F.R. § 1.98(d).

Applicant also wishes to make known to the Patent and Trademark Office that an application, Serial No. 09/945,134, describing and claiming subject matter that is similar to the subject matter of this application, was filed on August 31, 2001. This related application, as well as any prior art cited therein, may be material to the examination of this application. A copy of this related application as filed is submitted herewith in accordance with 37 C.F.R. § 1.98(d).

This information disclosure statement is being filed in compliance with 37 CFR 1.97(b)(3) as being filed before the mailing date of the first office action on the merits.

This information disclosure statement is being filed in compliance with 37 CFR 1.34(a) giving the undersigned attorney authorization to represent said party.

Please acknowledge receipt of this Information Disclosure Statement and kindly make the cited references of record in the above-identified application.

The Commissioner is authorized to charge any other fees which may be required, or credit any overpayment to Deposit Account No. 50-2319.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "R. Michael Ananian", written in a cursive style.

R. Michael Ananian  
Registration No. 35,050

DORSEY & WHITNEY LLP  
Suite 3400, Four Embarcadero Center  
San Francisco, California 94111-4187  
Telephone: (650) 494-8700  
Facsimile: (650) 494-8771  
1046353

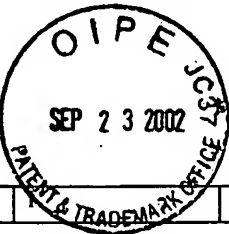
Please type a plus sign (+) inside this box ☒

PTO/SB/8A (08-00)

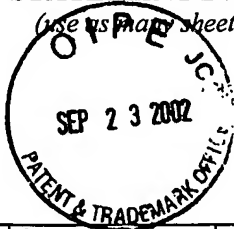
Approved for use through 10/31/2002. OMB 06518031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

| Substitute for form 1449A/PTO<br><b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br><i>(use as many sheets as necessary)</i> |                       |  |   | <b>Complete if Known</b>                         |  |  |
|---|-----------------------|--|---|--|--|--|
|    |                       |  |   | Application Number                               | 10/024,120   |  |
|   |                       |  |   | Filing Date                                      | December 17, 2001  |  |
|   |                       |  |   | First Named Inventor                             | Gleb V. KLIMOVITCH   |  |
|   |                       |  |   | Group Art Unit                                   | 2681   |  |
|   |                       |  |   | Examiner Name                                    | Not Yet Assigned   |  |
| Sheet   | 1                     | of   | 2   | Attorney Docket Number                           | A-70184/RMA (463438-12)  |  |
| <b>U.S. PATENT DOCUMENTS</b>  |                       |  |   |  |  |  |
| Examiner Initials*  | Cite No. <sup>1</sup> | U.S. Patent Document   | Name of Patentee or Applicant of Cited Document | Date of Publication of Cited Document MM-DD-YYYY | Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear      |  |
|   | A1                    | 5,282,222  | FATTOUCHE et al.                                | 01-25-1994                                       |  |  |
|   | B1                    | 5,305,353  | WEERACKODY                                      | 04-19-1994                                       |  |  |
|   | C1                    | 5,548,582  | BRAJAL et al.                                   | 08-20-1996                                       |  |  |
|   | D1                    | 5,592,490  | BARRATT et al.                                  | 01-07-1997                                       | <b>RECEIVED</b><br><br><b>SEP 25 2002</b><br><br><b>Technology Center 2600</b> |  |
|   | E1                    | 5,768,268  | KLEIN et al.                                    | 06-16-1998                                       |  |  |
|   | F1                    | 5,960,039  | MARTIN et al.                                   | 09-28-1999                                       |  |  |
|   | G1                    | 6,058,105  | HOCHWALD et al.                                 | 05-02-2000                                       |  |  |
|   | H1                    | 6,088,408  | CALDERBANK et al.                               | 07-11-2000                                       |  |  |
|   | I1                    | 6,285,720  | B1 MARTONE                                      | 09-04-2001                                       |  |  |
|   | J1                    | 09/678,420   | A MARTONE                                       | 10-2-2000  |  |  |
|   | K1                    | 09/945,134   | A MARTONE                                       | 08-31-2001                                       |  |  |
| <b>OTHER DOCUMENTS - NON-PATENT LITERATURE DOCUMENTS</b>  |                       |  |   |  |  |  |
| *Examiner Initials  | Cite No.              | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published | TRANSLATION                                     |  |  |  |
|   |                       |  | YES   | NO   |  |  |
|   | L1                    | ALMEIDA, L.B., "The Fractional Fourier Transform and Time-Frequency Representations," <i>IEEE Transactions on Signal Processing</i> , Vol. 42, No. 11, pp. 3084-3091, November 1994.   |   |  |  |  |
|   | M1                    | BAHAI, R.S. et al., "Chapter 2 - System Architecture", <i>MultiCarrier Digital Communication</i> , Plenum Publishers, New York, 1999, pp. 17-39.   |   |  |  |  |
|   | N1                    | DIJKERMAN et al., "Wavelet Representations of Stochastic Processes and Multiresolution Stochastic Models", <i>IEEE Transactions on Signal Processing</i> , Vol. 42, No. 7, July 1994, pp. 1640-1652.   |   |  |  |  |
|   | O1                    | DOROSLOVACKI et al., "Wavelet-Based Linear System Modeling and Adaptive Filtering", <i>IEEE Transactions on Signal Processing</i> , Vol. 44, No. 5, May 1996, pp. 1156-1167.   |   |  |  |  |
|   | P1                    | FORNEY, G. D., "Maximum-Likelihood Sequence Estimation of Digital Sequences in the Presence of Intersymbol Interference", <i>IEEE Transactions on Information Theory</i> , Vol. IT-18, No. 3, May 1972, pp. 363-378.   |   |  |  |  |
|   | Q1                    | FOSCHINI, G.J., "Layered Space-Time Architecture for Wireless Communication in a Fading Environment When Using Multiple Antenna Elements," <i>Bell Labs Tech. J.</i> , Vol. 1, No. 2, pp. 41-59, 1996.   |   |  |  |  |
|   | R1                    | GIANNAKIS et al., "Basis Expansion Models and Diversity Techniques for Blind Identification and Equalization of Time-Varying Channels", <i>Proceedings of the IEEE</i> , Vol. 86, No. 10, October 1998, pp. 1969-1986.   |   |  |  |  |
| Examiner Signature  |                       |  | Date Considered                                 |  |  |  |

|  |                         |   |   |                    |            |             |                   |                      |                    |                |      |               |                  |                        |                         |
|--|-------------------------|---|---|--------------------|------------|-------------|-------------------|----------------------|--------------------|----------------|------|---------------|------------------|------------------------|-------------------------|
| Substitute for form 1449A/PTO<br><b>INFORMATION DISCLOSURE<br/>                 STATEMENT BY APPLICANT</b><br><i>(use as many sheets as necessary)</i> |                         | <b>Complete if Known</b><br><div style="text-align: right; font-size: 1.2em; font-weight: bold;">RECEIVED</div> <div style="text-align: right; font-size: 1.1em;">SEP 25 2002</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Application Number</td> <td>10/024,120</td> </tr> <tr> <td>Filing Date</td> <td>December 17, 2001</td> </tr> <tr> <td>First Named Inventor</td> <td>Gleb V. KLIMOVITCH</td> </tr> <tr> <td>Group Art Unit</td> <td>2681</td> </tr> <tr> <td>Examiner Name</td> <td>Not Yet Assigned</td> </tr> <tr> <td>Attorney Docket Number</td> <td>A-70184/RMA (463438-12)</td> </tr> </table> |   | Application Number | 10/024,120 | Filing Date | December 17, 2001 | First Named Inventor | Gleb V. KLIMOVITCH | Group Art Unit | 2681 | Examiner Name | Not Yet Assigned | Attorney Docket Number | A-70184/RMA (463438-12) |
| Application Number   | 10/024,120              |   |   |                    |            |             |                   |                      |                    |                |      |               |                  |                        |                         |
| Filing Date  | December 17, 2001       |   |   |                    |            |             |                   |                      |                    |                |      |               |                  |                        |                         |
| First Named Inventor   | Gleb V. KLIMOVITCH      |   |   |                    |            |             |                   |                      |                    |                |      |               |                  |                        |                         |
| Group Art Unit   | 2681                    |   |   |                    |            |             |                   |                      |                    |                |      |               |                  |                        |                         |
| Examiner Name  | Not Yet Assigned        |   |   |                    |            |             |                   |                      |                    |                |      |               |                  |                        |                         |
| Attorney Docket Number   | A-70184/RMA (463438-12) |   |   |                    |            |             |                   |                      |                    |                |      |               |                  |                        |                         |
| Sheet  | 2                       | of  | 2 |                    |            |             |                   |                      |                    |                |      |               |                  |                        |                         |



| OTHER DOCUMENTS - NON-PATENT LITERATURE DOCUMENTS |             |  |             |    |
|---|-------------|--|-------------|----|
| *Examiner<br>Initials                             | Cite<br>No. | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published | TRANSLATION |    |
|   |             |  | YES         | NO |
|   | S1          | KUTAY, M.A. et al., "Optimal Filtering in Fractional Fourier Domains," <i>IEEE Transactions on Signal Processing</i> , Vol. 45, pp. 1129-1143, May 1997.   |             |    |
|   | T1          | MARTONE, M., "Cumulant-Based Adaptive Multichannel Filtering for Wireless Communication Systems with Multipath RF Propagation Using Antenna Arrays", <i>IEEE Transactions on Vehicular Technology</i> , Vol. 47, No. 2, May 1998, pp. 377391.                  |             |    |
|   | U1          | MARTONE, M., "An Adaptive Algorithm for Antenna Array Low-Rank Processing in Cellular TDMA Base Stations", <i>IEEE Transactions on Communications</i> , Vol. 46, No. 5, May 1998, pp. 627-643.   |             |    |
|   | V1          | MARTONE, M., "On MMSE Real-Time Antenna Array Processing Using Fourth-Order Statistics in the U.S. Cellular TDMA System", <i>IEEE Journal on Selected Areas in Communications</i> , Vol. 16, No. 8, October 1998, pp. 1396-1410.                               |             |    |
|   | W1          | OZATAKAS, H.M. et al., "Digital Computation of the Fractional Fourier Transform," <i>IEEE Transactions on Signal Processing</i> , Vol. 44, pp. 2141-2150, September 1996.  |             |    |
|   | X1          | PROAKIS, J.G., "Chapter 10-Communication Through Band-Limited Linear Filter Channels", <i>Digital Communications</i> , Third Edition, McGraw Hill, pp. 583-601.  |             |    |
|   | Y1          | RIOUL, O., "A Discrete-Time Multiresolution Theory", <i>IEEE Transactions on Signal Processing</i> , Vol. 41, No. 8, August 1993, pp. 2591-2606.   |             |    |
|   | Z1          | STRANG et al., "Chapter 3-The Noble Identities", <i>Wavelets and Filterbanks</i> , Wellesley-Cambridge Press, 1996, pp. 100-102.   |             |    |
|   | A2          | STRANG et al., "Chapter 6-Multiresolution", <i>Wavelets and Filterbanks</i> , Wellesley-Cambridge Press, 1996, pp. 174-219.  |             |    |
|   | B2          | VAN NEE, R. et al., "Chapter 5 - Coherent and Differential Detection", <i>OFDM for Wireless Multimedia Communications</i> , Artech House Publishers, Boston and London, 2000, pp. 95-117.  |             |    |
|   | C2          | ZHANG et al., "A Wavelet-Based KL-Like Expansion for Wide-Sense Stationary Random Processes", <i>IEEE Transactions on Signal Processing</i> , Vol. 42, No. 7, July 1994, pp. 1737-1745.  |             |    |
|   | D2          |  |             |    |
| Examiner Signature                                |             | Date Considered  |             |    |